DOCUMENT-IDENTIFIER: US 6306423 B1
TITLE: Neurotoxin implant

CLAIMS:

1. A controlled release system, comprising:

(a) a polymeric matrix, and;

(b) a quantity of neurotoxin located within the polymeric matrix, wherein fractional amounts of the neurotoxin can be released from the polymeric matrix over a prolonged period of time without a significant immune system response.

2. The controlled release system of claim 1, wherein neurotoxin is released from the polymeric matrix in a continuous or monophasic manner.

3. The controlled release system of claim 1, wherein the prolonged period of time during which neurotoxin is released from the polymeric matrix extends over of a period of time of from about 10 days to about 6 years.

4. The controlled release system of claim 1, wherein the polymeric matrix is comprised of a substance which is non-biodegradable.

5. The controlled release system of claim 1, wherein the neurotoxin comprises a polypeptide.

6. The controlled release system of claim 1, wherein the neurotoxin comprises a presynaptic neurotoxin.

7. The controlled release system of claim 1, wherein the neurotoxin is a Clostridial neurotoxin.

8. The controlled release system of claim 1, wherein the neurotoxin is a botulinum toxin.

9. The controlled release system of claim 1, wherein the neurotoxin is a botulinum toxin selected from the group consisting of botulinum toxin types A, B, C.sub.1, D, E, F and G.

10. The controlled release system of claim 1, wherein the neurotoxin is a botulinum toxin type A.

11. The controlled release system of claim 1, wherein the polymer which comprises the polymeric matrix is selected from the group consisting of methacrylate, vinyl pyrrolidone, vinyl alcohol, acrylic acid, polymethylmethacrylate, siloxane, vinyl acetate, lactic acid, glycolic acid, collagen, and bioceramic polymers and copolymers thereof.

12. The controlled release system of claim 1, wherein the quantity of the neurotoxin is between about 1 unit and about 50,000 units of a botulinum toxin.

13. The controlled release system of claim 1, wherein the quantity of the neurotoxin is between about 10 units and about 2,000 units of a botulinum toxin type A.

14. The controlled release system of claim 1, wherein the quantity of the neurotoxin is between about 100 units and about 30,000 units of a botulinum toxin type B.

15. The controlled release system of claim 1 wherein the neurotoxin is a botulinum toxin which is released in an amount effective to cause flaccid muscular paralysis of a muscle or muscle group at or in the vicinity of the implanted system.

16. A controlled release system, comprising:

(a) a polymeric matrix, and;

(b) between about 10 units and about 20,000 units of a botulinum toxin within the polymeric matrix, wherein fractional amounts of the botulinum toxin can be released from the polymeric matrix over a prolonged period of time extending from about 2 months to about 5 years without a significant immune system response.

17. A method for making a controlled release system which will not induce a significant immune response, the method comprising the steps of:

(a) dissolving a polymer in a solvent to form a polymer solution;

(b) mixing or dispersing a neurotoxin in the polymer solution to form a polymer-neurotoxin mixture, and;

(c) allowing the polymer-neurotoxin mixture to set or cure, thereby making a controlled release system.

19. A method for using a continuous system release system, the method comprising injection or implantation of a controlled release system which includes a polymeric matrix and a neurotoxin, thereby treating a movement disorder or a disorder influenced by cholinergic innervation without causing a significant immune system response.

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Donovan et al.

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(45) **Date of Patent: Oct. 23, 2001**

(54) **NEUROTOXIN IMPLANT**

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(58) **Field of Search** 424/423, 422, 424/426, 184.1, 204.1, 206.1, 234, 236.1, 244, 247.1, 259, 260, 274.1; 514/964

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(57) **ABSTRACT**

A biocompatible implant for continuous in vivo release of a neurotoxin over a treatment period extending from one month to five years. The implant can be made of casting a solution of a polymer, such as an ethyl vinyl acetate copolymer and the neurotoxin. The neurotoxin can be a botulinum toxin.

20 Claims, No Drawings